

# **Draft Report**

## **Fish Tissue Dioxin Investigation for Dugdemona River (Subsegment #081401)**

*Prepared for:*

**U.S. EPA Region 6  
1445 Ross Avenue, Suite 1200  
Dallas, Texas 75202**

*Prepared by:*

**PARSONS**  
8000 Centre Park Drive, Suite 200  
Austin, Texas 78754

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## **EXECUTIVE SUMMARY**

This report details the results of a field investigation and laboratory analysis of fish tissue data and an effluent sample that were collected from the Dugdemona River and the Smurfit-Stone Container Corporation near Hodge, Louisiana. Historical sampling of two fish samples in 1985 to 1986 indicated the presence of dioxin in one whole body fish sample and the virtual lack of all dioxin congeners in the other fish sample collected in which only the edible fish tissue was analyzed (EPA 1992). Given the paucity of data, its age, and the conflicting nature of the available data and information on dioxin, EPA Region 6 chose to fund the collection of additional edible fish tissue samples from the Dugdemona River to ascertain whether the concern for dioxin in fish tissue is valid. EPA Region 6 contracted with Parsons to conduct the fish tissue sampling, both upstream and downstream of the Smurfit-Stone outfall, and collect one four part composite effluent sample from the Smurfit-Stone Container facility, and prepare a this report detailing the findings. Based on the results of this study, EPA could then make a more technically valid decision on whether to recommend the removal of the water body from the LDEQ 303(d) list or to proceed with the completion of a TMDL.

Under this investigation, a total of eight fish samples were collected during the week of February 18, 2002, at locations upstream and downstream from the paper mill and analyzed for dioxin. In addition, one four part composite effluent sample was collected at the Smurfit-Stone facility's outfall 001 and analyzed for dioxin. The Smurfit-Stone Container Corporation provided assistance throughout the sampling event.

Analytical results from this investigation indicate detection of two dioxin congeners (1,2,3,4,6,7,8-HpCDD and OCDD) in three of the eight fish collected. However, the dioxin concentration in all three fish samples is well below the screening value established by the Louisiana Department of Health and Hospitals (LDHH) for the protection of human health. No samples contained detectable concentrations of either 2,3,7,8-TCDD or 2,3,7,8-TCDF.

One sample of effluent from the Smurfit Stone Container Corporation was analyzed and the results indicated all dioxin congeners were below detection limits with the exception of OCDD, which had a value of 340 pg/L (pico grams per liter). This value converts to a toxicity equivalent (TEQ) of 0.034 pg/L, using EPA 1998 TEQs.

The results of this fish tissue and effluent data provide adequate evidence that bioaccumulation of dioxin concentrations in fish tissue are no longer a human health concern when compared to the LDHH screening values. Therefore, EPA supports the recommendation that a dioxin TMDL is not necessary for the Dugdemona River. Removal from the LDEQ Clean Water Act 303(d) list will be recommended for this water body.

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## **ACRONYMS AND ABBREVIATIONS**

CWA	Clean Water Act
EPA	Environmental Protection Agency
GPS	Global positioning system
LDEQ	Louisiana Department of Environmental Quality
LDHH	Louisiana Department of Health and Hospitals
ppq	Parts per quadrillion
QAPP	Quality assurance project plan
TDS	Total dissolved solids
TEC	Toxicity equivalency concentration
TEQ	Toxicity equivalent
TMDL	Total maximum daily load

## **SECTION 1 INTRODUCTION**

### **1.1 PROJECT BACKGROUND**

Section 303(d) of the Federal Clean Water Act (CWA) requires states to identify water bodies that are not meeting state water quality standards and to develop total maximum daily loads (TMDL) for those water bodies. A TMDL is the amount of pollutant that a water body can assimilate without exceeding the established water quality standard for that pollutant. The Louisiana Department of Environmental Quality's (LDEQ) October 28, 1999 Court Ordered §303(d) List included the Dugdemona River (Subsegment 081401 of the Ouachita River Basin) as impaired based on concerns for high levels of dioxin in fish. In November 2001, the U.S. Environmental Protection Agency Region 6 (EPA) contracted with Parsons to compile and assess all existing and readily available data pertaining to dioxin concentrations in fish tissue and water within the Dugdemona River watershed. The purpose of conducting this assessment was to better define the severity of the impairment and if it was in fact necessary to prepare a TMDL for dioxin for the Dugdemona River as required by Section 303(d) of the CWA. In January 2002, Parsons compiled the data assessment results and recommendations in a report to EPA titled "Data Assessment for Water Bodies in the Ouachita River Basin listed for Dioxin on the Louisiana Department of Environmental Quality's 1999 CWA Section 303(d) List" (January 2002 Report).

The key findings of the January 2002 Report include:

- No fish consumption advisory exists for the Dugdemona River.
- The Smurfit-Stone Container Corporation's paper mill (NPDES permit number LA0007684) in Hodge, Louisiana has never utilized a chlorine bleaching process, the primary cause of elevated dioxins in paper mills, and there is no information to suggest that the facility has ever contained dioxin in its discharge.
- Despite the apparent lack of dioxin sources, a carp composite sample taken in the late 1980's as part of the Environmental Protection Agency's (EPA) National Bioaccumulation Study (EPA 1992) had an extremely high Toxicity Equivalency Concentration (TEC) of dioxin. However, because the carp TEC was measured as a whole-body concentration the sample was not considered directly comparable to the human health based screening value for fish consumption advisories (EPA 1989). The only other fish tissue data available from the Dugdemona River was a composite filet sample taken from a predatory fish species, also part of the National Bioaccumulation Study (EPA 1992), which had a TEC well below relevant human health

based screening values. Thus there was conflicting evidence regarding dioxin impairment in the Dugdemona River.

Given the paucity of data, its age, and the conflicting nature of the available information, EPA Region 6 chose to fund the collection of additional edible fish tissue samples from the Dugdemona River an effluent sample from the Smurfit-Stone Container Corporation to verify whether the concern for dioxin in fish tissue is valid. EPA Region 6 contracted with Parsons to conduct the fish tissue sampling, both upstream and downstream of the Smurfit-Stone outfall, and collect one four part composite effluent sample, and prepare this report detailing the findings. Based on the results of this study, EPA could then make a more technically valid decision on whether to recommend the removal of the water body from the LDEQ 303(d) list or to proceed with the completion of a TMDL.

## **1.2 PROJECT RESPONSIBILITIES**

EPA Region 6 (Dallas, Texas) served as the project lead organization for this investigation. Parsons (Austin, Texas) performed the planning, sampling, laboratory coordination, and reporting. Sampling access was provided by the Smurfit-Stone Container Corporation (Hodge, Louisiana). Triangle Laboratories (Durham, North Carolina) provided the analytical laboratory services for the fish and effluent samples.

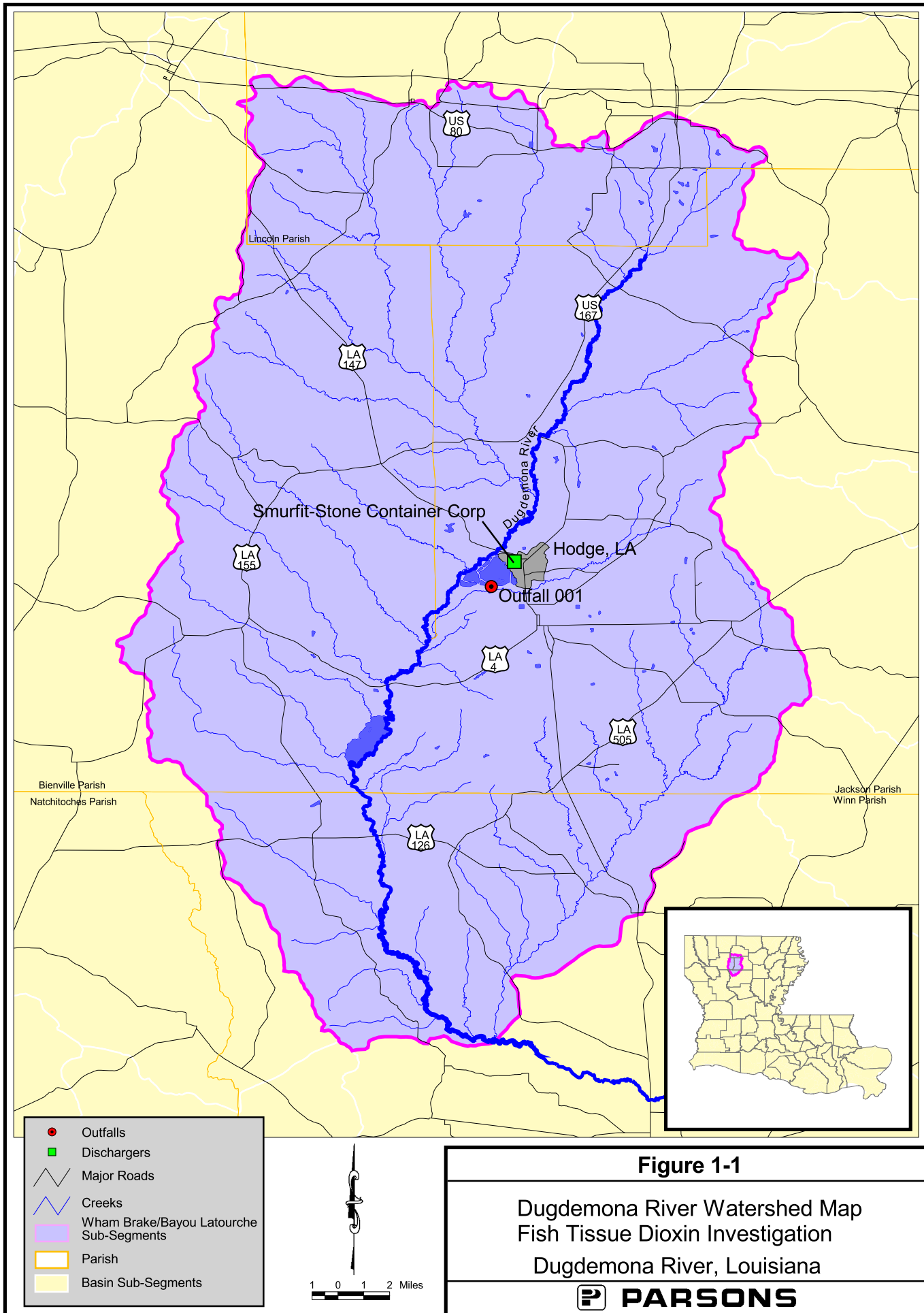
## **1.3 DESCRIPTION OF WATERSHED AND DISCHARGERS**

The Dugdemona River is located in the Ouachita River Basin in north central Louisiana. The river extends approximately 207 kilometers from its confluence with the Little River near Rochelle, Louisiana to its headwaters just west of Simsboro, Louisiana. Additional headwater flows are brought from the Grambling and Ruston, Louisiana area via the Madden Creek/Redwine Creek and the Cypress Bayou/Shepherd Creek systems. The Dugdemona River is divided into Subsegments 081401 and 081402. Subsegment 081401 (See Figure 1-1) stretches from the headwaters to where Big Creek joins the Dugdemona River (near river kilometer 85.75), and is the focus of this study

Most of the tributaries to the Dugdemona River are intermittent, although a few are perennial. The main stem of the Dugdemona River upstream of LA 147, above the Smurfit-Stone plant, becomes a series of pools during low flow periods. The main stem of the river tends to become a dry streambed a short distance upstream of Cypress Creek (river kilometer 178.80). Evaporation, transpiration, and shallow groundwater recharge may be responsible for flow losses from the Dugdemona River (LDEQ 2001).

Subsegment 081401 lies in the parishes of Lincoln, Jackson, and Bienville in a natural region of Louisiana known as the hills. The region has the greatest elevations and relief, as well as some of the oldest rocks and soils in the state. The soil has limited productivity so there is relatively little agricultural activity in the watershed (see Table 1.1). The watershed for subsegment 081401 primarily contains forestland with a





significant amount of rangeland and wetlands. The native forestland is composed of longleaf pine forests and mixed forests with lesser amounts of bottomland hardwood forests along the river, although much of the forestland may be currently used for silviculture (LDEQ 2001). There is very little urban area in the watershed, with most being concentrated near the headwaters and around Jonesboro and Hodge, Louisiana.

**Table 1.1  
Land Use**

Land Use	Acres	Percent
Agricultural land	22,927	5.97
Barren	198	0.05
Forest	203,010	52.88
Rangeland	86,084	22.42
Urban	1,247	0.32
Water	7,478	1.95
Wetlands	62,995	16.41
Total	383,939	100

Source LDEQ, 2001

The LDEQ Surface Water Quality Standards designate uses of primary and secondary contact recreation and fish and wildlife propagation for Subsegment 081401 (LDEQ 2000). In addition to dioxin impairment, Subsegment 081401 has also been listed as impaired for fish and wildlife propagation due to low dissolved oxygen levels. Water quality standards for total dissolved solids (TDS), chlorides, and sulfate are higher than reference streams and other subsegments in the Ouachita River Basin because the Dugdemona River receives effluent from a paper mill and several municipal wastewater treatment plants (LDEQ 2001). The list of permitted dischargers provided in Table 1.2 was compiled to verify that there are no known sources of dioxin currently discharging within the watershed.

**Table 1.2  
Permitted Dischargers**

Facility	Permit Number	Description	Facility Type	Receiving Water Body	Permitted Capacity (mgd)
Smurfit-Stone Hodge Mill/Plant	LA0007684	External, sanitary wastewater, process wastewater, storm water	Paper Mill	Dugdemona River	8.5
Town of Grambling POTW	LA0038822	Sanitary Wastewater	Oxidation Pond	Redwine Creek, Dugdemona River	1.5

<b>Facility</b>	<b>Permit Number</b>	<b>Description</b>	<b>Facility Type</b>	<b>Receiving Water Body</b>	<b>Permitted Capacity (mgd)</b>
City of Jonesboro, North Oxidation Pond	LA0046477	Sanitary Wastewater	Oxidation Pond	Little Dugdemona River, Dugdemona River	0.5
Village of North Hodge	LA0039829	Sanitary Wastewater	Oxidation Pond	Unnamed ditch/swamp, Dugdemona River	0.062
Ruston Development Center	LAG540268, LA0032042	Sanitary Wastewater		Spring Creek, Madden Creek, Dugdemona River	0.025
Pinecrest Apts., Ltd.	LAG540569	Sanitary Wastewater		Redwine Creek, Madden Creek, Dugdemona River	0.025
Village of Quitman	LAG560118	Sanitary Wastewater	Oxidation Pond	Parish Ditch, Cypress Bayou, Dugdemona River	0.050
Ball-Foster Glass Container Company	LA0007650	Sanitary Wastewater, Storm Water		Madden Creek, Dugdemona River	0.0241
Willamette Industries, Surepine Division	LA0007803	Sanitary Wastewater		Parish ditch, Madden Creek, Dugdemona River	0.0056
City of Jonesboro, East Oxidation Pond	LA0038539	Sanitary Wastewater	Oxidation Pond	Unnamed tributary, Little Dugdemona River, Dugdemona River	0.30
City of Jonesboro, South Oxidation Pond	LA0038547	Sanitary Wastewater		Antwine Creek, Big Creek, Dugdemona River	0.20
Village of East Hodge	LA0039756	Sanitary Wastewater	Oxidation Pond	Unnamed ditch, Little Dugdemona River, Dugdemona River	0.06
Pabco, Inc. (formerly Caliste Group)	LA0046281	Sanitary Wastewater, Storm Water	Insulation manufacturer	Unnamed ditch, Madden Creek, Dugdemona River	0.002
Village of Simsboro, Wastewater Treatment Plant	LA0065102	Sanitary Wastewater		Unnamed creek, Madden Creek, Dugdemona River	0.158

<b>Facility</b>	<b>Permit Number</b>	<b>Description</b>	<b>Facility Type</b>	<b>Receiving Water Body</b>	<b>Permitted Capacity (mgd)</b>
Willamette Industries, Dodson Sawmill/Plywood Plant	LA0076953	Sanitary Wastewater, Storm Water	Sawmill/ Plywood plant	Antwine Creek, Big Creek, Dugdemona River	0.0025
Willamette Industries, Arcadia Oriented Strand Beam Plant	LA0097721	Sanitary Wastewater, Storm Water	Veneer wood products manufacturer	Unnamed tributaries, Dugdemona River	0.0018
Mid-State Wood Preservers	LA0101940	Sanitary Wastewater, Storm Water	Wood products manufacturer	Dugdemona River	0.0008
Willamette Industries, Simsboro Laminated Beam Plant	LA0106259	Sanitary Wastewater, Storm Water	Laminated/ veneer wood products manufacturer	Unnamed tributary, Madden Creek, Dugdemona River	0.0015
Blankenship Trailer Park	LAG530086	Sanitary Wastewater		Unnamed tributary, Dugdemona River	0.005
Peachland Village Mobile Home Park	LAG540197	Sanitary Wastewater		Unnamed ditch, Barnett Springs Creek, Shepherd Creek, Cypress Bayou, Dugdemona River	0.025
Weston High School	LAG540816	Sanitary Wastewater		Unnamed ditch, Brown Creek, Beech Creek, Big Creek, Dugdemona River	0.025
Jadath Tank Battery	GP11171	Storm Water	Oil and gas tank battery	Dugdemona River	--
Diamond Enterprises, Inc.	GP11173	Storm Water	Logging, construction and hauling	Unnamed ditch	--
Hayes Truck Stop	GP7531	Storm Water	Truck stop / service station	Unnamed drainage	--
Jonesboro Wood Products	GP9382	Storm Water	Logging operation	Muddy Creek, Dugdemona River	--
Jonesboro Generating Plant	LA0007757	Storm Water	Power generating plant	Little Dugdemona River	--
Barnes Hardwood, Inc., Simsboro Mill	LA00016057 08, LA0102016	Storm Water, log spray overflow	Lumber Mill	Unnamed streams, Madden Creek,	--

<b>Facility</b>	<b>Permit Number</b>	<b>Description</b>	<b>Facility Type</b>	<b>Receiving Water Body</b>	<b>Permitted Capacity (mgd)</b>
				Dugdemona River	
City of Ruston, South Side Plant (PROPOSED)	LA0036331	Sanitary Wastewater	Proposed POTW	Future site unknown	--
Grambling State University (CLOSED)	LA0054704	Sanitary Wastewater	Sewage treatment plant	Redwine Creek, Madden Creek, Dugdemona River	--
LI Ready Mix Plant #11, a division of TXI	WP5118	Treated process wastewater, Storm Water	Temporary concrete mixing plant	Storm drainage, Shepherd Creek, Cypress Bayou, Dugdemona River	--
LI Ready Mix Plant #12, a division of TXI	LA0105481	Treated process wastewater, Storm Water	Temporary concrete mixing plant	Local Drainage, Little Dugdemona River, Dugdemona River	--
General Electric Rail Car Repair Service	LA0108189	Storm water	Rail car repair facility	Little Dugdemona River, Dugdemona River	--
Jackson Parish Police Jury Debris Landfill	WP4916	Storm water	Debris Landfill	Little Dugdemona River, Dugdemona River	--

Source:LDEQ 2001

The Smurfit-Stone paper mill is permitted to discharge approximately 8.5 million gallons of treated process and storm water per day. The effluent generated by Smurfit-Stone undergoes several treatment steps prior to being discharged, including sedimentation, pre-aeration, aerated lagoons, stabilization ponds, color removal, and post-aeration. No effluent data for dioxin was available from Smurfit-Stone because there is no dioxin sampling requirement in their wastewater permit. A biological survey from 1986 indicated that the number of fish species below the Smurfit-Stone outfall was not significantly different than the number above the outfall and that important game and commercial species are found downstream of the Smurfit-Stone plant (LDEQ 2001). Furthermore, the number of fish species below the outfall had increased since 1968 due in part to the continual improvement of the effluent treatment process at the Smurfit-Stone plant (LDEQ 2001). The Smurfit-Stone plant has never utilized chlorine bleaching in its operations and is therefore an unlikely source of dioxin.

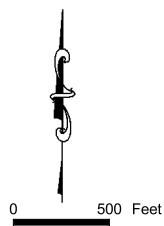
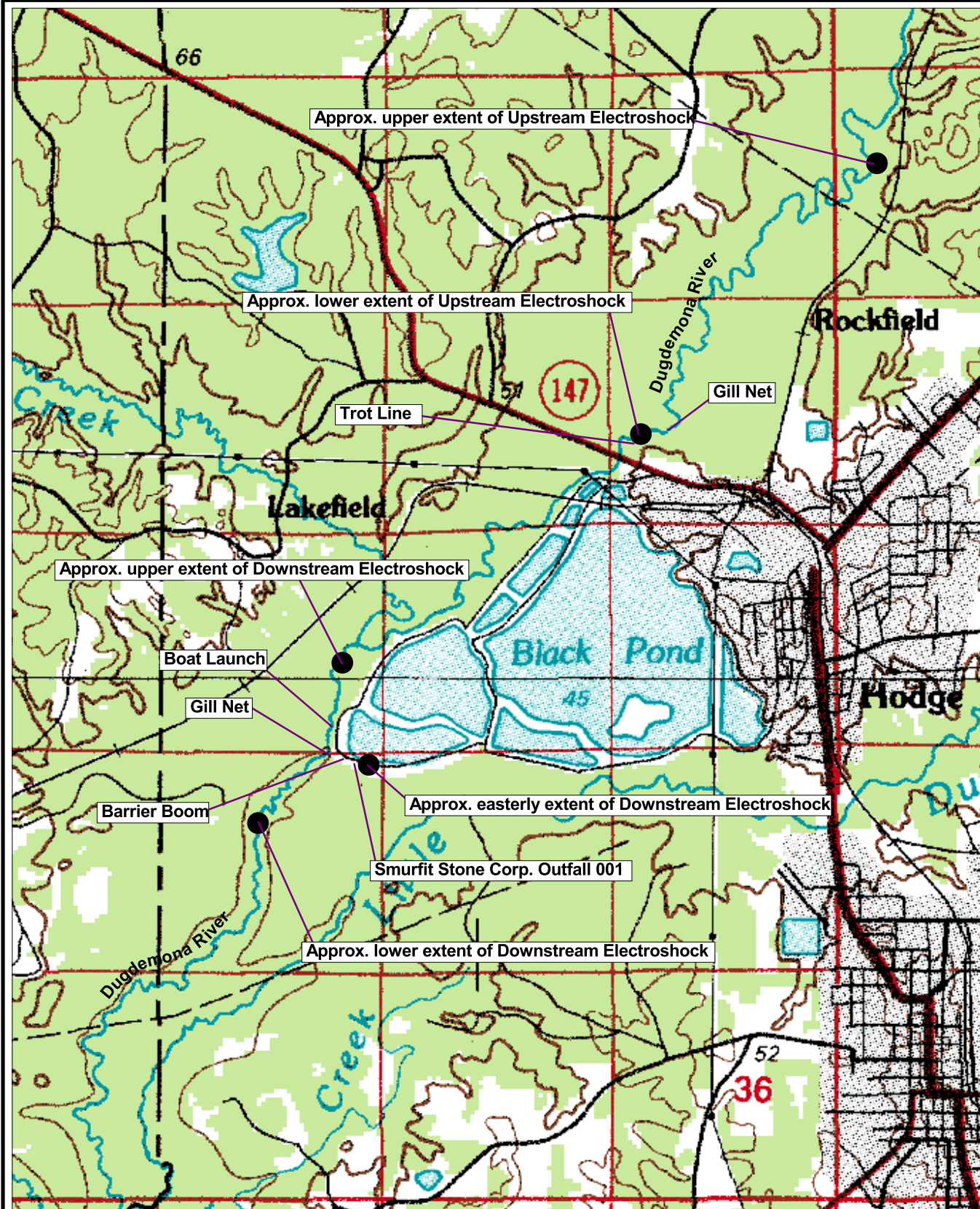
## **SECTION 2**

### **INVESTIGATION METHODS**

A detailed description of sampling, sample handling, laboratory procedures, and quality control procedures was prepared by Parsons in the Fish Collection and Analysis for Dugdemona River (Segment #081401), Quality Assurance Project Plan (QAPP), Revision 1, Parsons, January 29, 2002. The QAPP (Parsons 2000) was approved by EPA on February 1, 2002.

Fish collection activities were conducted during the week of February 18, 2002 under a Louisiana Wildlife and Fisheries Scientific Collection Permit (Permit FC-05-02) and included electroshocking, gill netting, and use of a trot line. Fish were collected at an upstream location (beginning approximately 2 miles upstream of the discharge outfall) and at a downstream location (both at the discharge outfall and downstream). Figure 2-1 illustrates the extent of sampling for both the upstream and downstream locations. The samples were collected at least 2 miles apart to decrease the possibility of fish movement from one location to the next. After collection, fish were immediately placed on ice, then weighed, measured (total length), grouped by species and relative size, filleted, and shipped via overnight courier to the analytical laboratory for analysis by EPA Method 1613 (EPA 2000).

A four part composite of effluent water was collected at the Smurfit-Stone discharge outfall. All samples were maintained on ice or frozen until laboratory analysis. Global Positioning System (GPS) coordinates were taken at four specific locations during the field work and these coordinates and their description are summarized in Table 2-1.



**Figure 2-1**

Sampling Locations  
Fish Tissue Dioxin Investigation  
Dugdemona River, Louisiana



Table 2-1  
GPS Locations  
Dugdemona River  
Jackson Parish, LA

Latitude	Degrees	Minutes	Longitude	Degrees	Minutes	Description
N	32	15.7964	W	92	45.6881	Dugdemona River, Downstream Location, Initial Boat Launch
N	32	15.7543	W	92	45.5603	Smurfit Stone Corporation, Outfall 001 Structure
N	32	15.7605	W	92	45.6484	Barrier Boom at Centerline of Canal from Outfall Structure to Dugdemona River
N	32	17.042	W	92	44.233	Dugdemona River, Upstream Location, Gill Net Location



## **SECTION 3**

### **DATA SUMMARY AND RESULTS**

#### **3.1 DATA SUMMARY**

A total of sixteen fish were collected for dioxin analysis during the four days of field efforts. Fourteen of the fish were collected downstream from the Smurfit-Stone facility outfall location which included spotted gar, blue catfish, yellowbreast sunfish, carp, and white crappie. The remaining two fish, from the upstream location, were yellowbreast sunfish and blue catfish.

A rainfall event (1-inch to 1.5-inches, 24 to 16 hours preceding the first day of sampling) may have affected the fish activity and collection success.

Figure 2-1 shows sampling locations and other important features along this stretch of the Dugdemona River.

Table 3-1 details information on the fish collected for the investigation. Table 3-1 also describes the compositing scheme for each sample and any anomalies with the samples.

Table 3-2 shows the dioxin analysis results for the fish and effluent samples.

Table 3-3 shows dioxin toxicity equivalent (TEQs) on only the samples and analytes with analytical detections.

Table 3-4 provides the water quality measurements collected and any miscellaneous measurements from the field.

#### **3.2 UPSTREAM RESULTS**

Analytical results from one of the upstream fish samples exhibited low levels of two dioxin congeners (1,2,3,4,6,7,8-HpCDD: highest detection of 3.4 pg/g; OCDD: highest detection of 19.1 pg/g).

#### **3.3 DOWNSTREAM RESULTS**

Analytical results from the downstream samples showed two dioxin congeners in two of the six fish samples (1,2,3,4,6,7,8-HpCDD: highest detection of 2.6 pg/g; OCDD: highest detection of 14.8 pg/g). These levels were comparable and slightly lower than the upstream tissue results. All other samples and all other congeners, including 2,3,7,8-TCDD and 2,3,7,8-TCDF were not detected in the fish tissues.

Table 3-1  
Fish Information February 2002  
Dugdemona River  
Jackson Parish, LA

No. of Samples	Month	Year	Water Body	Tissue Sample ID	Composite of # of Individuals	Species	Length (inches)	Length (mm)	Weight (lbm)	Weight (gm)	Comments
1	Feb	2002	Dugdemona River	Dugd-Dn-01	3	Spotted Gar	26.5	673.1	2.69	1220	
							26	660.4	2.69	1220	
							26	660.4	2.82	1280	
2	Feb	2002	Dugdemona River	Dugd-Dn-02	1	Blue Catfish	19.75	501.65	3.31	1500	
3	Feb	2002	Dugdemona River	Dugd-Dn-03	1	Yellowbreast Sunfish	7	177.8	0.25	115	with scales
4	Feb	2002	Dugdemona River	Dugd-Dn-04	4	Carp (Small)	17	431.8	2.20	1000	
							16	406.4	2.01	910	
							14	355.6	1.34	610	
							13.25	336.55	1.15	520	
5	Feb	2002	Dugdemona River	Dugd-Dn-05	1	White Crappie	8.75	222.25	0.35	160	
6	Feb	2002	Dugdemona River	Dugd-Dn-06	4	Carp (Large)	20.5	520.7	4.51	2045	
							18.5	469.9	3.77	1710	
							17.75	450.85	2.43	1100	
							17	431.8	1.98	900	
Dup	Feb	2002	Dugdemona River	Dugd-Dn-Dup	Dup=same as above	Carp (Large)	Dup=same as above				
7	Feb	2002	Dugdemona River	Dugd-Up-01	1	Yellowbreast Sunfish	5.5	139.7	0.11	48	with scales
8	Feb	2002	Dugdemona River	Dugd-Up-02	1	Blue Catfish	18.5	469.9	2.73	1240	

Total Fish Retained      16

Samples collected and maintained on ice      2/20/2002 to 2/22/2002  
Samples shipped to laboratory      2/25/02

Table 3-2  
Fish and Effluent Results  
Dugdemona River  
Jackson Parish, LA

Parameter	Sample ID: Media Fish Species Units	DUGD-UP-01 Fish Tissue Yell. Brst Sunfish pg/g	DUGD-UP-02 Fish Tissue Blue Catfish pg/g	DUGD-DN-01 Fish Tissue Spotted Gar pg/g	DUGD-DN-02 Fish Tissue Blue Catfish pg/g	DUGD-DN-03 Fish Tissue Yell. Brst Sunfish pg/g	DUGD-DN-04 Fish Tissue Carp pg/g	DUGD-DN-05 Fish Tissue White Crappie pg/g	DUGD-DN-06 Fish Tissue Carp pg/g	DUGD-DN-DUP (DUGD-DN-06) Fish Tissue Carp pg/g		DUGD- DISCHARGE Water  pg/L
2,3,7,8-TCDD		< 0.69	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.55	< 0.5	< 0.5		< 10
2,3,7,8-TCDF		< 0.69	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.55	< 0.5	< 0.5		< 10
1,2,3,7,8-PeCDD		< 3.4	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.7	< 2.5	< 2.5		< 52
1,2,3,7,8-PeCDF		< 3.4	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.7	< 2.5	< 2.5		< 52
2,3,4,7,8-PeCDF		< 3.4	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.7	< 2.5	< 2.5		< 52
1,2,3,4,7,8-HxCDD		< 3.4	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.7	< 2.5	< 2.5		< 52
1,2,3,6,7,8-HxCDD		< 3.4	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.7	< 2.5	< 2.5		< 52
1,2,3,7,8,9-HxCDD		< 3.4	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.7	< 2.5	< 2.5		< 52
1,2,3,4,7,8-HxCDF		< 3.4	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.7	< 2.5	< 2.5		< 52
1,2,3,6,7,8-HxCDF		< 3.4	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.7	< 2.5	< 2.5		< 52
1,2,3,7,8,9-HxCDF		< 3.4	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.7	< 2.5	< 2.5		< 52
2,3,4,6,7,8-HxCDF		< 3.4	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.7	< 2.5	< 2.5		< 52
1,2,3,4,6,7,8-HpCDD		< 3.4	3.4	2.6	< 2.5	< 2.5	< 2.5	< 2.7	< 2.5	< 2.5		< 52
1,2,3,4,6,7,8-HpCDF		< 3.4	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.7	< 2.5	< 2.5		< 52
1,2,3,4,7,8,9-HpCDF		< 3.4	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.7	< 2.5	< 2.5		< 52
OCDD		< 6.9	19.1	14.8	< 5.0	< 5.0	< 5.0	< 5.5	9.3	14.5		340
OCDF		< 6.9	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.5	< 5.0	< 5.0		< 104
<div> <div>Tissue Standard</div> <div>TEQ Screening Calculations<sup>A,B</sup> 2,3,7,8-TCDD*(1.0)+ 2,3,7,8-TCDF*(0.1) 2,3,7,8-TCDD</div> <div>pg/g 1.56</div> </div>											<div>Water Standard</div> <div>pg/L</div> <div>0.72</div>	< 10

pg/g = pico grams/gram  
pg/L = pico grams/Liter  
all tissues in wet weight

A = Louisiana Dept. of Health Memo November 28, 2001: WHO TEQ Calculation  
Dioxin Human Health Screening Values Derived from  
LDHH Guidance

	RL	CSF	BW	CR	Fish tissue SV (mg/kg)	(pg/g)
LDHH	0.0001 <sup>1,2</sup>	150000 <sup>1,2,3</sup>	70 <sup>1,2</sup>	0.03 <sup>3</sup>	1.56E-06	1.56
EPA <sup>4</sup>	1.00E-04	1.56E+05	70	0.0175	2.56E-06	2.56

SV=Screening Value; [(RL/CSF)\*BW]/CR  
RL = Risk Level; e.g., 10-6, 10-5, 10-4  
CSF = Dioxin cancer slope factor  
BW = Body weight; Assumed to be 70 kg  
CR = Mean daily consumption rate (kg/d)  
LDHH = Louisiana Department of Human Health  
EPA = Environmental Protection Agency

Sources:

- LDHH, 1997. Protocol for Issuing Health Advisories and Bans Based on Chemical Contamination of Fish/Shellfish in Louisiana. Louisiana Department of Health and Hospitals, Office of Public Health. January 1997.
- LDHH, 2001. Louisiana Department of Health and Hospitals (LDHH). November 28, 2001. Fish Consumption Advisory for Wham Brake, Bayou Lafourche, and Lake Irwin Louisiana Department of Environmental Quality.
- Hartley, W. 2001. Memo from Dr William Hartley reviewing joint LDHH and Tulane SPH&TM dioxin risk assessment in fish from Wham Brake, Bayou Lafourche, and Lake Irwin.
- USEPA 2000. Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories, Volume 1: Fish Sampling and Analysis, 3rd Edition, USEPA Document 823B00007, November 2000.

B = Using reporting limit as value for non-detect results

Table 3-3  
Fish and Effluent Results w TEQ  
Dugdemona River  
Jackson Parish, LA

Parameter  TEQ Factor:	Raw Analytical Results		TEQ Calculations		Sum of TEQs	Tissue Standard <sup>C</sup>	Units
	1,2,3,4,6,7,8- HpCDD	OCDD	1,2,3,4,6,7,8- HpCDD 0.01	OCDD 0.0001	Sum of TEQs 1,2,3,4,6,7,8- HpCDD & OCDD		
DUGD-DN-01 Spotted Gar	<b>2.6</b>	<b>14.8</b>	0.026	0.00148	0.02748	1.56	pg/g
DUGD-DN-06 Carp	< 2.5	<b>9.3</b>	< 0.025	0.00093	< 0.02593	1.56	pg/g
DUGD-DN-DUP (DUGD-DN-06) Carp	< 2.5	<b>14.5</b>	< 0.025	0.00145	< 0.02645	1.56	pg/g
DUGD-UP-02 Blue Catfish	<b>3.4</b>	<b>19.1</b>	0.034	0.00191	0.03591	1.56	pg/g
DUGD-DISCHARGE water effluent	< 52	<b>340</b>	< 0.52	0.034	< 0.554	Water Standard <sup>D</sup> 0.72	pg/L

pg/g =  
pg/L =  
all tissues in wet weight

pico grams/gram  
pico grams/Liter

A = USEPA Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories  
Volume 1, Fish Sampling and Analysis, 3rd Edition, EPA 823-B-00-007, November 2000  
TEF-98, Table 5-7

B = Using reporting limit as value for non-detect results

C = LDHH, 1997. Protocol for Issuing Health Advisories and Bans Based on Chemical  
Contamination of Fish/Shellfish in Louisiana. Louisiana Department of Health and Hospitals, Office of  
Public Health. January 1997.

D = Louisiana Department of Environmental Quality, Title 33, Part IX, 1113 December 2000

Table 3-4  
Water Quality Data  
Dugdemona River  
Jackson Parish, LA

Parameter	Units	Upstream	Downstream	Effluent	Effluent	Effluent	Effluent	Total
				Four Part Composite over 9.5 hrs				
Date		2/21/02	2/20/02	2/20/02	2/20/02	2/20/02	2/20/02	
Time	(24hr)	1130	1750	1000	1335	1645	1950	
pH	units	7.67	6.15	7.56	7.3	7.55	7.78	
Water Temp	deg F	59.9	58.3	63.5	71.3	69.2	63.3	
Water Temp	deg C	15.5	14.6	17.5	21.8	20.7	17.4	calc'd
Conductivity	uS/cm	60.4	69.9	1624	1970	1880	1565	
Dissolved Oxygen	mg/L	10.95	10.92	11.16	11.63	11.29	10.93	
Air Temp (estimated)	deg F	65	50	50	65	65	50	
Air Temp (estimated)	deg C	18.3	10.0	10.0	18.3	18.3	10.0	calc'd
Total Shock Time	minutes	180	260					440
Total Gill Net Time	minutes	1320	1020					2340
Total Trot Line Time	minutes	960	0					960
Fish Retained/Site		2	14					14
Fish/Hour of Effort		0.05	0.66					0.66
								Average

### **3.4 EFFLUENT RESULTS**

One four part composite sample of effluent collected over 10 hours from the Smurfit-Stone Outfall 001 was analyzed for dioxin and furans. All congeners were below the detection limits with the exception of OCDD, which had a value of 340 pg/L. This value translates to a toxicity equivalent (TEQ) of 0.034 pg/L, using EPA 1998 TEQs.

### **3.5 SUMMARY OF RESULTS**

Concentrations of the two dioxin congeners of significance (2,3,7,8-TCDD and 2,3,7,8-TCDF) were non-detect in all of the fish tissue samples (not detected at <0.5 pg/g to <0.69 pg/g) and the composite effluent sample (not-detected <10 pg/L) collected.

Toxicity Equivalents (TEQ) were calculated using 1998 World Health Organization criteria for the detected analytes. Even using the conservative assumption that non detections are entered as the reporting limit, the sum of TEQs for the two congeners detected in fish samples are below the tissue screening value of 1.56 pg/g used by the Louisiana Department of Health and Hospitals.

Reviewing the “Sum of TEQs” column for the detected analytes on Table 3-4 shows that with the TEQ calculations, the sum of TEQs for the two congeners detected are all also below the tissue screening value of 1.56 pg/g used by the Louisiana Department of Health and Hospitals.

The results of this fish tissue and effluent data provide adequate evidence that bioaccumulation of dioxin concentrations in fish tissue are no longer a human health concern. Therefore, EPA supports the recommendation that a dioxin TMDL is not necessary for the Dugdemona River. Removal from the LDEQ 303(d) list will be recommended for this water body.

## **SECTION 4 PHOTOGRAPHIC LOG**



**PHOTO 1: DUGDEMONA RIVER UPSTREAM SAMPLING LOCATION, UPSTREAM OF HIGHWAY 147. TYPICAL CROSS SECTION WITH TURBID WATER FOLLOWING RAINSTORM. FEBRUARY 2002**



**PHOTO 2: DUGDEMONA RIVER, CANAL FROM SMURFIT STONE CONTAINER CORPORATION OUTFALL TO THE RIVER. FISH COLLECTION BY ELECTROSHOCKING. FEBRUARY 2002**



**PHOTO 3: DUGDEMONA RIVER, UPSTREAM SAMPLING LOCATION, FISH COLLECTION USING ELECTROSHOCKING, SHOCKING IN DEBRIS PILES ALONG SHORELINE. FEBRUARY 2002**



**PHOTO 4: DUGDEMONA RIVER, UPSTREAM LOCATION, FISH COLLECTION USING ELECTROSHOCKING IN OVERHANGING DEBRIS. FEBRUARY 2002**





**PHOTO 5: DUGDEMONA RIVER, ON CANAL AT DISCHARGE OUTFALL FROM SMURFIT  
STONE CONTAINER CORPORATION. COLLECTION OF CARP WITH NET AFTER  
ELECTROSHOCKING. FEBRUARY 2002**



**PHOTO 6: DUGDEMONA RIVER, DOWNSTREAM LOCATION, CANAL FROM OUTFALL TO  
RIVER, FLOATS FOR GILL NET WHICH IS SET ACROSS THE CHANNEL, EXTRA GILL NET  
ON FAR SHORE IN TUB. FEBRUARY 2002**



**PHOTO 7: DUGDEMONA RIVER, REMOVING GAR FROM GILL NET AT DOWNSTREAM LOCATION. CATFISH AND CARP IN NET BELOW. FEBRUARY 2002**



**PHOTO 8: DUGDEMONA RIVER, DOWNSTREAM LOCATION, SPOTTED GAR COLLECTED IN GILL NET, GOING INTO COOLER ON ICE. FEBRUARY 2002**

## **SECTION 5 REFERENCES**

- Louisiana Department of Environmental Quality. 2000. Environmental Regulatory Code: Part IX. "Water Quality Regulations". Baton Rouge, LA: Office of Water Resources, Water Quality Management Division.
- Louisiana Department of Environmental Quality (LDEQ). 2001. Dugdemona River (Headwaters to the Junction with Big Creek) Watershed TMDL for Biochemical Oxygen-Demanding Substances and Nutrients. Office of Environmental Assessment, Environmental Technology Division. Baton Rouge, LA.
- Parsons 1-2002, Fish Collection and Analysis for Dugdemona River (Segment #081401), Quality Assurance Project Plan (QAPP), Revision 1, Parsons, January 29, 2002.
- USEPA. 1989. Assessing Human Health Risks from Chemically Contaminated Fish and Shellfish: A Guidance Manual. U.S. Environmental Protection Agency, Office of Marine and Estuarine Protection, EPA-503-8-89-002. September 1989.
- USEPA. 1992. National Study of Chemical Residues in Fish - Volumes 1 & 2. U.S. Environmental Protection Agency, Office of Science and Technology, EPA 823-R-92-008a. September 1992.
- USEPA 2000, Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories, Volume 1: Fish Sampling and Analysis, 3rd Edition, 2000, USEPA Document 823B00007.
- Triangle 1-2001, Triangle Laboratories PCDDs and PCDFs by HRGC/HRMS – Methods 1613 A&B, January 24, 2001.
- Triangle 12-2001, Triangle Laboratories Quality Assurance Manual, 801 Capitola Drive, Durham, North Carolina 27713, December 21, 2001.

## **APPENDIX A DATA VALIDATION SUMMARY REPORT**

**Data Verification Report**  
**For Samples Collected From**  
**Dugdemona River Area**  
**February 21, 2002**

Data Verifier: Jim Taylor  
Parsons- Austin

The following data verification summary covers eight (8) fish tissue samples, one (1) field duplicate sample and one (1) environmental water sample collected at Dugdemona River area on February 21, 2002. The data packages are 56734A and 56734Br1 and they include the following samples:

DUG-DN-01, DUG-DN-02, DUG-DN-03, DUG-DN-04, DUG-DN-05,  
DUG-DN-06, DUG-DN-DUP, DUG-UP-01, DUG-UP-02, and  
DUG-DISCHARGE.

The fish tissue and water samples were analyzed for dioxins and furans by United States Environmental Protection Agency (USEPA) SW846 Method 1613.

**Review Criteria**

All samples were collected by Parsons and were analyzed by Triangle Laboratories, Inc. following procedures outlined in the Dugdemona River Quality Assurance Project Plan (QAPP).

A chemist from Parsons has verified data submitted by the laboratory. Information reviewed included sample log, chain of custody (COC), case narratives, sample results, internal standard recoveries, ongoing precision and recovery samples, ion-abundance ratios, calibration verification (VER), field duplicate samples and method blanks. The conclusions in the report are based on the reviewed criteria and whether the laboratory derived tolerances were met.

**Accuracy**

Accuracy is determined by evaluating the percent recovery (%R) of the internal standard recoveries, ongoing precision and recovery samples, and ion-abundance ratios. The %R for the internal standard recoveries, ongoing precision and recovery samples, and ion-abundance ratios were all within tolerance.

**Precision**

Precision is determined by evaluating the Relative Percent Difference (RPD) of the field duplicates. Sample "DUGD-DN-DUP" was collected and analyzed as a field duplicate of sample "DUGD-DN-06". The RPD for the sample and field duplicate are given below:

1,2,3,4,6,7,8,9-OCDD

Sample	Result (pg/g)	RPD
DUGD-DN-06	9.3	43.70%
DUGD-DN-DUP	14.5	

The RPD was determined for 1,2,3,4,6,7,8,9-OCDD because it was the only compound that had a concentration above the reporting level. There are no tolerances given in the method or in the laboratories standard operating procedure (SOP) for the evaluation of RPD. Using the National Functional Guidelines tolerance for solids to evaluate the RPD, the RPD meets the minimum criteria of 70%.

### **Representativeness**

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing actual analytical procedures to those described in the COC;
- Evaluating holding times; and
- Examining laboratory blanks for contamination of samples during.

All samples were prepared and analyzed following the COC. All samples were prepared and analyzed within the hold time required for the respective analysis. All method blanks were reviewed and found to be free of target analytes above the RL. All VERs were in laboratory and method tolerance.

### **Completeness**

Completeness is established by comparing the total number of samples with the total number of samples with valid analytical data. In this case, completeness is 100%.